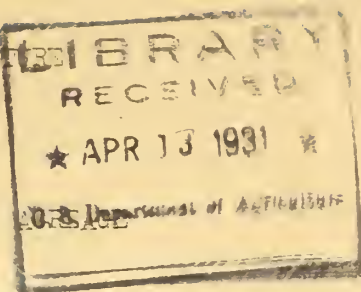


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RELATION BETWEEN PRODUCTION, PRICES, AND ACREAGE
OF POTATOES IN IDAHO

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The purpose of these talks was to acquaint those interested in the current potato situation with some of the basic facts of production, prices, and acreage changes of recent years and to draw from these facts such tentative conclusions concerning prospects for 1931 as may help producers to determine their acreage policies in the spring of 1931. The main conclusions that may be drawn from these facts are:

- (1) The prices received by growers for the 1929 and 1930 crops are likely to lead to a general increase in acreage throughout the country.
- (2) A general increase in acreage, given normal weather conditions, is likely to produce a national crop of around 420,000,000 bushels, compared with about 360,000,000 bushels in 1930.
- (3) A supply of this magnitude would tend to produce a lower price level for the 1931 crop than has been received so far for the 1930 crop, unless a considerable improvement in demand develops before growers begin to market their 1931 crop.
- (4) In view of the long-continued business depression it is unlikely that any improvement in the buying power of consumers by the fall and winter of 1931 will be sufficient to offset the effect of the prospective increase in the national supply.
- (5) Should the general level of potato prices be lower in 1931 than in the 1930 season, prices in Idaho are also likely to be lower, but the extent of the decline in the level of prices for Idaho potatoes will depend somewhat on the size of the crop in Idaho and to some extent on the supply of potatoes in the northwestern States.
- (6) The current tendency toward acreage expansion in Idaho and in the northwest may be offset by lower average yields per acre in 1931 if normal weather conditions prevail. This is likely to result in a supply of Idaho and northwestern potatoes only slightly below the record crop of 1930.

1. Variation in Acreage Yield, Production and Price
of Potatoes in Idaho

The record of changes in acreage, yield, production and price of potatoes in Idaho from 1919 to 1930, inclusive, is contained in Figure 1.

The acreage record shows that a considerable expansion took place in 1921 and 1922 and again in 1926 and 1927, with the higher level of acreage of 1927 maintained in recent years. Between 1919 and 1930 the acreage in Idaho expanded from 43,000 to 117,000, or an increase of nearly 300 per cent. The reductions in acreage which took place in 1923, 1924, and 1929 followed years of low prices and the increases in acreage followed years of high prices (see prices in lower section of Figure 1). The prices received for the 1929 and 1930 crops are roughly comparable to the prices received for the 1926 and 1927 crops, which produced an increase in acreage in 1928. The recent prices thus suggest an increase in Idaho potato acreage for 1931.

The yields per acre shown in Figure 1 indicate that the average yield in 1930 of 214 bushels was a record and compares with the previous record of 212 bushels in 1927 and 196 bushels in 1925. The low yields in recent years were approximately 170 bushels in 1928, in 1929, and in 1924. As a result of the increase in acreage and increase in average yields per acre, production in Idaho has expanded from nearly 7,000,000 bushels in 1919 to a record of 25,000,000 bushels in 1930. During this period the average rate of increase in Idaho production has been about 1,500,000 bushels per year. Compared with this upward trend the crops of 1924 and 1929 were relatively light and the crops of 1930, 1927, and 1922 were relatively large. Assuming normal weather conditions for 1931, yields per acre are likely to be approximately half way between the recent high and low yields per acre, or approximately 190 bushels. On this assumption the lower yields would somewhat more than offset the prospect of a 5 per cent intended increase in acreage, as reported by growers during January 1931.

The course of average prices received by growers throughout the State of Idaho since 1919 show very high prices in 1919, 1925, and 1929 - the seasons when the national supplies were below average. Unusually low prices prevailed in 1922 and 1928 - years of large national crops. These price fluctuations are only partly reflections of the supply of potatoes in Idaho; they suggest the dependence of Idaho prices on the supply and demand conditions prevailing in competing areas outside of Idaho.

2. Relation Between Prices in Idaho and (1) Average Prices Received by Growers in the United States and, (2) Production in Idaho

The dominating factor in the yearly changes in prices received by Idaho potato growers appears to be the general level of prices received by growers throughout the United States, as may be seen in Figure 2, where f.o.b. prices in Idaho Falls in cents per hundred pounds are compared with average prices received by growers throughout the United States for the crops of 1923 through 1930. During this period the yearly average at Idaho Falls has fluctuated in sympathy with the national average. Ordinarily the average at Idaho Falls is lower than the average throughout the country, but the margin between the price at Idaho Falls and the national average price tends to vary from season to season; thus the prices at Idaho Falls were considerably below the general average in 1927 and in 1930, while they were only slightly below the national average in 1929, 1925, and 1924. A comparison between these margins and the size of the Idaho crop indicates that the Idaho supply of 1927 and 1930 are responsible for establishing the lower level of prices in Idaho, in relation to the national average, and the light crops of 1929 and 1924 explain the relative high prices in Idaho

in relation to the national price level. This fact is illustrated in the lower section of Figure 2. Here the production in Idaho, expressed as deviations from the trend of production shown in Figure 1 are related to the differences between the average prices in Idaho Falls and the average prices received by growers throughout the United States.

The effect of supply of Idaho potatoes also appears in the premiums that Idaho potatoes usually bring on the Chicago markets, in comparison with prices paid for potatoes from other sections. This is illustrated in Figure 3. The upper section of this Figure contains the average price for Idaho Russets during the month of November for each of the seasons, 1922 and including 1930; also the average prices for other potatoes, mostly potatoes from Wisconsin, Minnesota, and Michigan. In November 1924 the price premium of Idaho potatoes over other potatoes amounted to somewhat over \$1.00 per hundred pounds, but in 1930 the premium was only around 25 cents per one hundred pounds. The fact that these changes in premiums are influenced by the supply of potatoes from Idaho is indicated in the lower section of Figure 3, where the November premiums are related to the total shipments of potatoes from Idaho for the corresponding seasons. The large shipments in 1927 and 1930 thus explain the lower margins in November of these seasons and the very light shipments of only 12,000 cars in 1924 explain the high premium of that year.

5.- Relation Between Prices Received and Subsequent Changes in Potato Acreage in the United States

The size of the total United States potato crop in 1931, as it may influence the prices in Idaho, may be partly anticipated from the usual relation between prices received by potato growers and subsequent changes in acreage, and by the reported intentions to plant in 1931. The average prices received so far for the 1930 crop, together with the average prices received for the 1929 crop relative to prices of farm products in general, are sufficient to induce an acreage expansion in 1931, provided growers throughout the country respond to prices as they have in previous years. The nature of that response is indicated in Figure 4. This Figure has been so constructed as to show the influence of prices received for the crop one year preceding the acreage change, and the price received for the crop two years preceding the acreage change. The horizontal lines marked "zero" represent the acreage of the preceding year. The curve rising above the horizontal line represents increases in acreage and below that line it represents decreases in acreage. According to the average relation (Section 1), an average price of \$1.00 per bushel has in the past tended to maintain acreage unchanged, whereas a price of \$1.20 per bushel tended to increase acreage by approximately 300,000 acres, and prices above that level also tended to expand acreage by about the same amount. Prices below \$1.00 per bushel tended toward acreage reductions.

The second section of this Figure shows similar relations between the prices received two years earlier and the acreage changes by year. It appears that high prices two years earlier have only a slight influence toward acreage expansion, whereas low prices two years earlier have a considerable influence in reducing acreage.

Section 4 of this Figure compares the actual changes that have taken place in the United States total acreage from 1921 through 1929, with changes in acreage as estimated on the basis of prices received for the two preceding crops. The prices received for the 1930 crop of about \$1.00 per bushel is equivalent to about \$1.30 per bushel in terms of the level of commodity prices which prevailed prior to the depression of 1930. On the basis of past experience, such a relative price for the 1930 crop and the somewhat higher price of the 1929 crop indicates an expansion in acreage for 1931 of over 300,000 acres.

This tendency toward acreage expansion is corroborated by reports received from growers that they intend to increase their 1930 acreage by approximately 6 per cent, or about 200,000 acres.

Potato growers in Idaho also intend to respond to prices received for the two preceding crops about as they have done in the past. This is illustrated in Figure 5 which contains an analysis of acreage changes in Idaho related to the prices received for preceding crop and the prices received for the crop two years preceding. The chief difference between the response of growers in Idaho and the combined response of all growers through the country is that the average prices which tends to maintain acreage unchanged in Idaho is considerably lower than the average price for the country as a whole. As in the preceding analysis, the prices used in this Figure are weighted average prices received by growers, adjusted to the general farm commodity price level that prevailed prior to the recent depression.

Yields per acre, the other factor in the supply prospect for 1931, can not now be indicated since that will depend on climatic conditions; but inasmuch as yields for 1930 and 1929 were below average, the assumption of normal weather conditions for 1931 would indicate higher yields per acre for the country as a whole than those of 1930. During recent years, yields per acre for the country as a whole have been as low as 104 bushels and as high as 127 bushels.

A combination of increases in acreage and average yields is likely to produce a total national crop of about 420,000,000 bushels, compared with the 1930 crop of about 360,000,000 bushels, and this would tend toward a lower average price throughout the country in the fall of 1931 if not offset by an increase in demand. An estimate of the possible decline in the general average of potato prices may be obtained from Figure 6. The upper section of this Figure contains the usual relation between the total supply of potatoes in the United States and the average price received by growers throughout the country, these prices being adjusted to the general level of food prices which prevailed in 1926. A crop of 360,000,000 bushels is thus related to prices of about \$1.38 per bushel, while 420,000,000 bushels is related to a price of about 93 cents per bushel. This difference of 45 cents per bushel represents the average decline in the general level of potato prices that may be expected as a result of the prospective increase in supply, provided demand conditions do not improve materially.

The lower section of Figure 6 indicates the influence of changes in the general level of food prices on the general level of potato prices, providing supplies remain unchanged; thus a decline in the general level of food prices from an index of 100 to an index of 80 is associated with a decline in the general level of potato prices of about 38 cents per bushel.

The general level of prices for 1931 may thus be estimated from these two curves in Figure 6. A price of 93 cents for a crop of 420,000,000 bushels would be reduced by 38 cents if the general level of food prices in 1931 is 80 per cent of the level which prevailed in 1926, or it would be reduced by 20 cents per bushel if the level of food prices were 90 per cent of the 1926 level. With food prices in January 1931 about 80 per cent of the 1926 level, these relations would indicate a general level of potato prices for 1931 of around 60 to 70 cents per bushel, or around \$1.00 per hundred pounds, compared with \$1.68 per hundred pounds in 1930, as indicated in Figure 2.

4.- Probable Demand Conditions in the 1931 Potato Season

Satisfactory methods of forecasting business conditions and food prices in general, many months in advance, have not yet been developed. A review of economic factors in the business situation at the beginning of 1931 shows that some are favorable for a termination of the decline in business and for a beginning of a period of revival. Among these factors are:

- (1) Low interest rates and Federal and State activities favoring expansion in construction work.
- (2) Low commodity prices favoring expansion in industries using these commodities as raw materials; for example, cotton in the textile industry.
- (3) Recent increases in employment in such industries as the automobile, iron and steel, and railroads, and recent advances in industrial stock prices.

Such developments as these have, in previous periods of depression, preceded the subsequent recovery; other factors, however, point to a possible further delay in the beginning of recovery. Among them are:

- (1) The greatly reduced buying power of the farmer and continued declines in important farm-product prices.
- (2) The greatly reduced incomes of the industrial population for the last year or more.
- (3) The continued depression in other countries which reduces the foreign demand for American industrial and farm products.

In balancing these divergent tendencies to obtain an indication of the domestic demand prospect it is helpful to compare the current depression with previous ones. This is done in Figure 7 which shows the duration of periods of declining business, the extent of decline, and the nature of the subsequent improvement. The lines that first descend and then rise represent the course of industrial activity following the prosperity peaks of January 1920, in April 1923, September 1926, and June 1929. The figures at the bottom represent the number of months after each peak. The decline after January 1920 continued for 18 months to July 1921. This was followed by a gradual recovery. The decline after June 1929 has so far followed the course of the major depression of 1920 and 1921. By January 1931 the present depression had already fallen below the low point reached in 1921 to

approximately 40 per cent below the peak of June 1929. Taking the optimistic view, that the course of business from now on may continue to follow the course taken in 1921 and 1922, the level of activity that may be reached by next fall on this assumption may be somewhat over 70 per cent of the peak, compared with about 65 per cent which is the average level of business activity that prevailed during the fall of 1930. The level of business activity and consumer incomes next fall is therefore not likely to show any marked improvement over that which prevailed during the marketing of most of the 1930 crop. Without a marked improvement in the domestic business situation it would not be reasonable to expect any great advance in the level of food prices in general, above that which prevails at the present time (for in January 1931 the index of food prices in the United States was about 75 per cent of the level in 1926).

5.- Probable Level of Idaho Prices for the 1931 Crop

The comparison between national and local prices (fig.2) indicates that a decline in the general level of potato prices from \$1.68 per hundred pounds in 1930 to around \$1.00 per hundred pounds in 1931 would be accompanied by a comparable decline in the level of f.o.b. prices at Idaho Falls with Idaho production maintained at the 1930 record. Ordinarily a normal crop in Idaho (as indicated by the trend of production in fig. 1) would tend to establish prices at Idaho Falls approximately 30 cents below the general average for the United States. On the assumption of a crop of 22,000,000 or 23,000,000 bushels in Idaho in 1931 an average level of prices at Idaho Falls approximately 70 cents per hundred pounds may be anticipated. Another record crop would tend toward prices below this level and a small crop would tend toward prices somewhat higher than this level. Even though the exact level of Idaho prices can not now be indicated, it is important to observe in planning the 1931 production that the average level of Idaho prices for the 1931 crop season, according to present information, is likely to be lower than during the 1930 season, and it may approximate the low prices that now prevail on the marketings of the last half of the 1930 crop rather than the higher prices received for the first half of the 1930 crop.

POTATOES: ACREAGE, YIELD, PRODUCTION, AND FARM PRICE IN IDAHO, 1919 TO DATE



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Figure 1.

POTATOES: FARM PRICES IN UNITED STATES, F.O.B. PRICES AT IDAHO FALLS, AND IDAHO PRODUCTION

CENTS PER
100 POUNDS

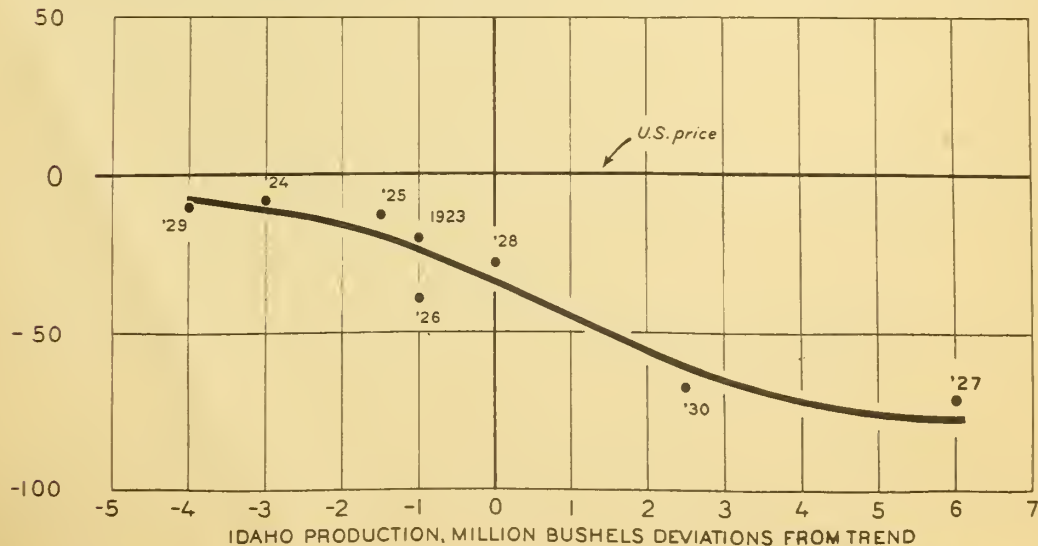
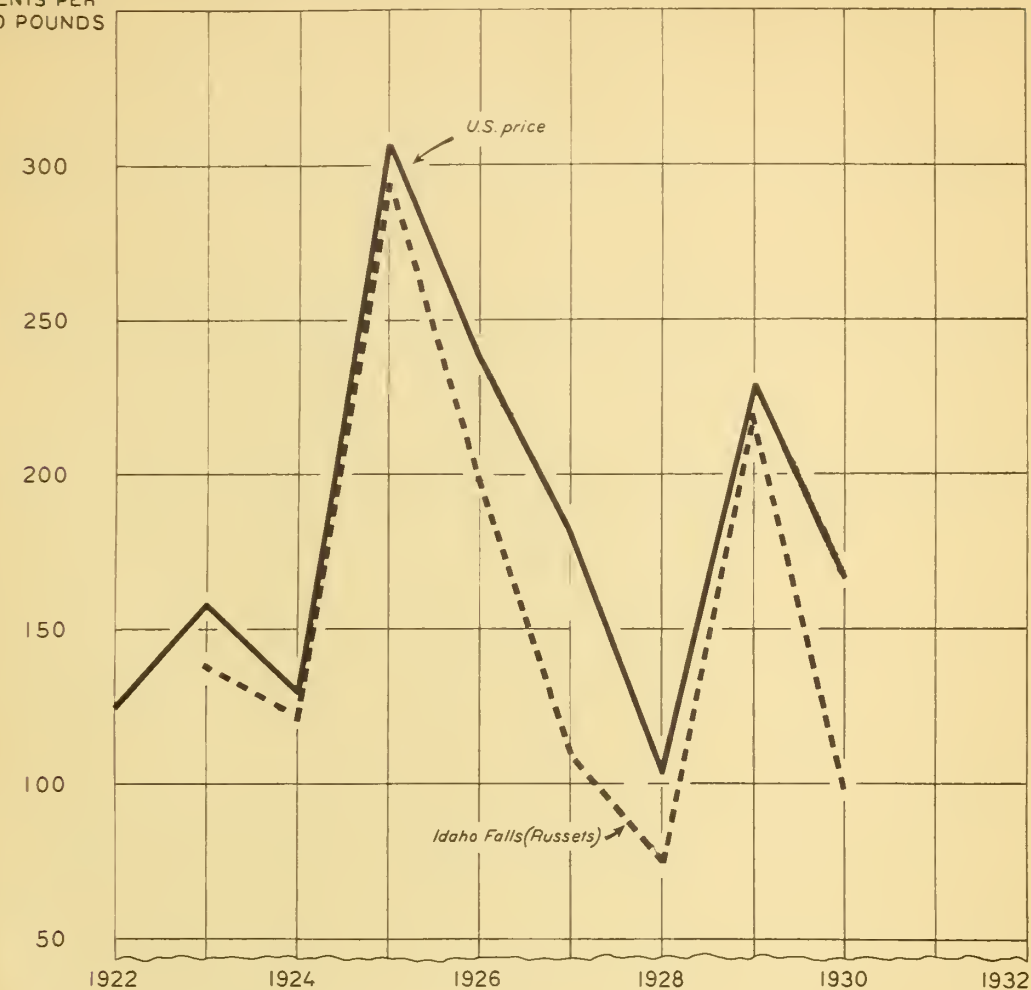


FIGURE 2

PRICE PREMIUMS OF IDAHO RUSSET BURBANK OVER OTHER POTATOES AT CHICAGO IN NOV., AND IDAHO SHIPMENTS

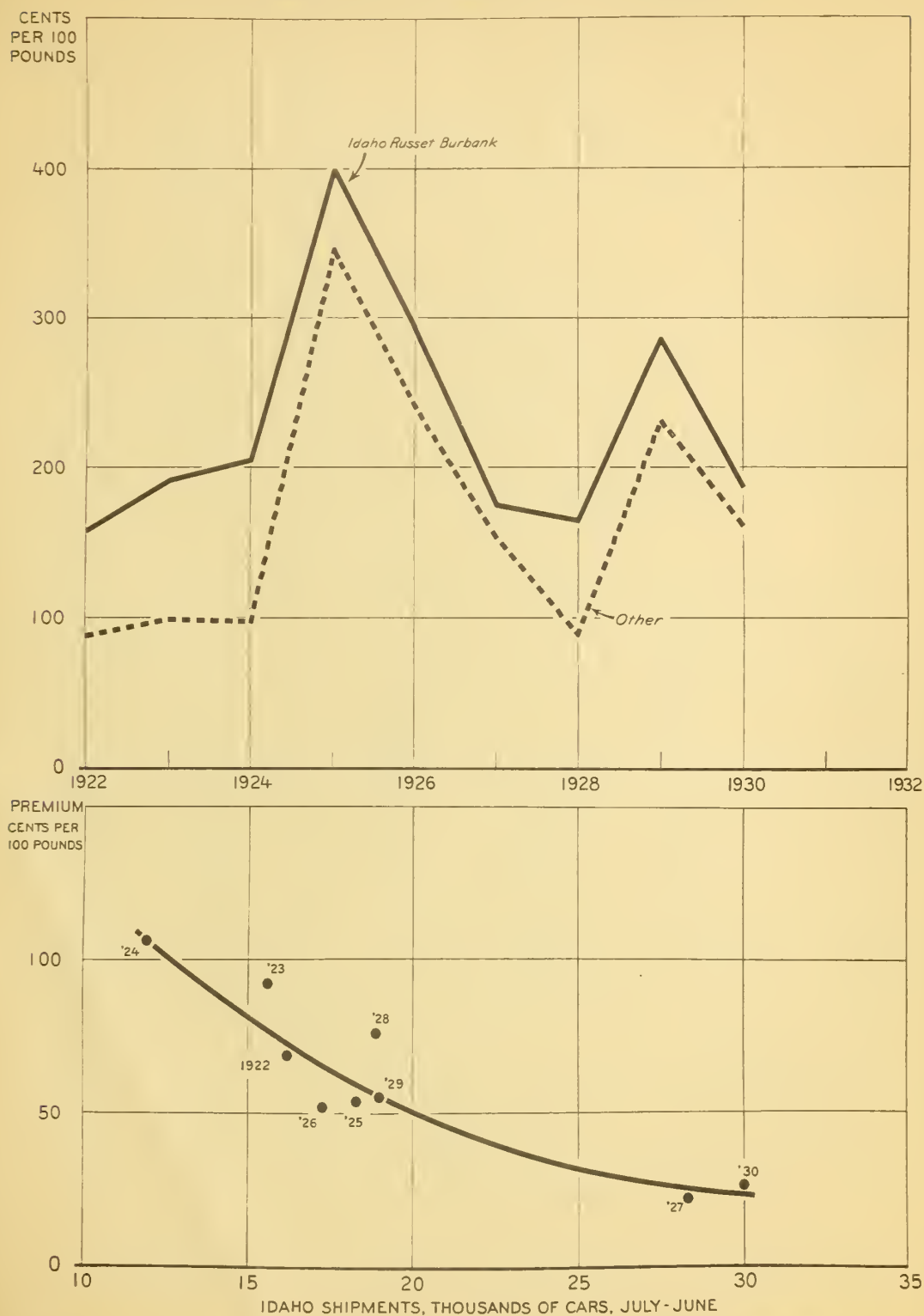


Figure 3

RELATION BETWEEN PRICES RECEIVED BY GROWERS AND CHANGES IN THE UNITED STATES POTATO ACREAGE

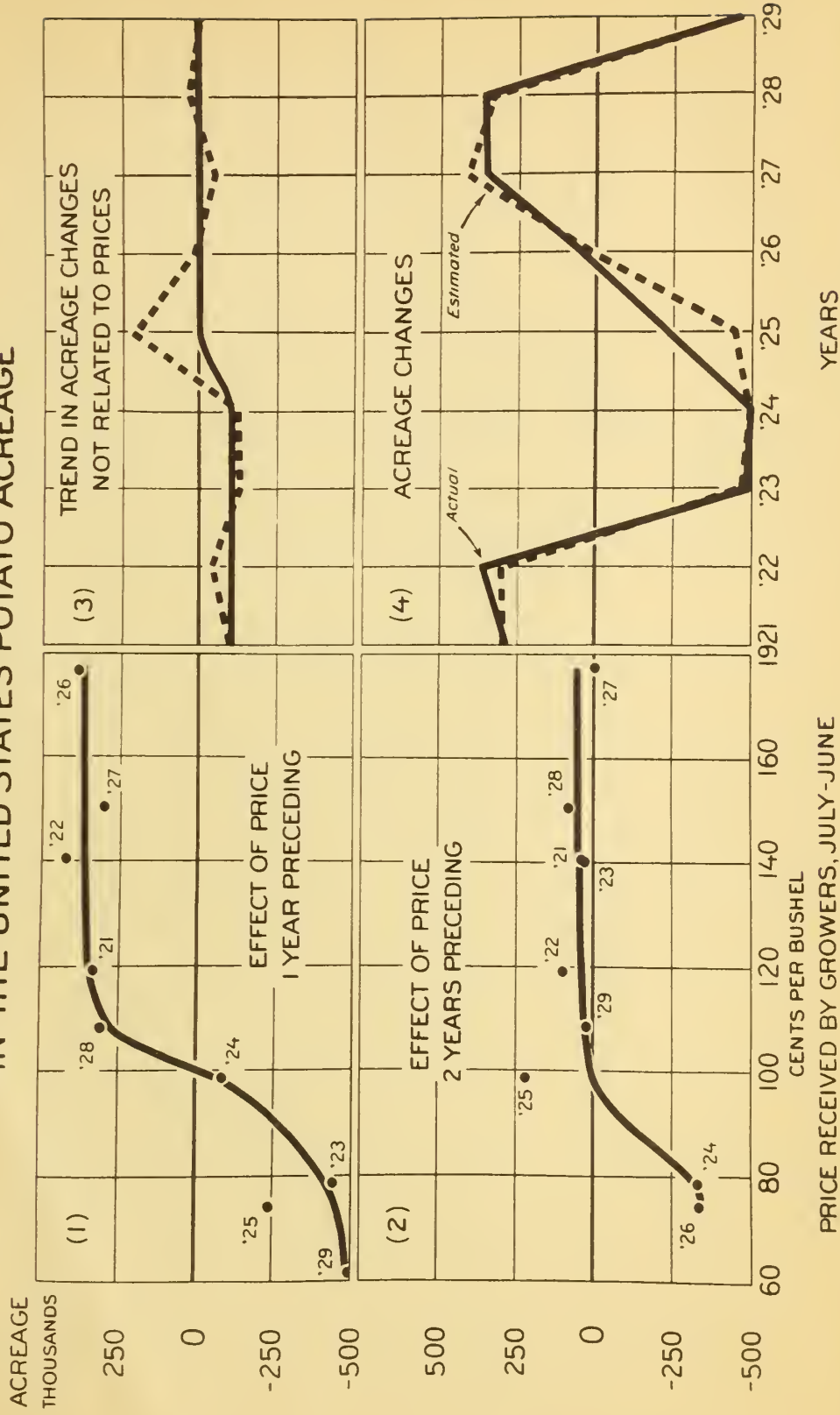


Figure 4.

RELATION BETWEEN PRICES RECEIVED BY GROWERS AND CHANGES IN THE IDAHO POTATO ACREAGE 1919-1929

ACRES
THOUSANDS

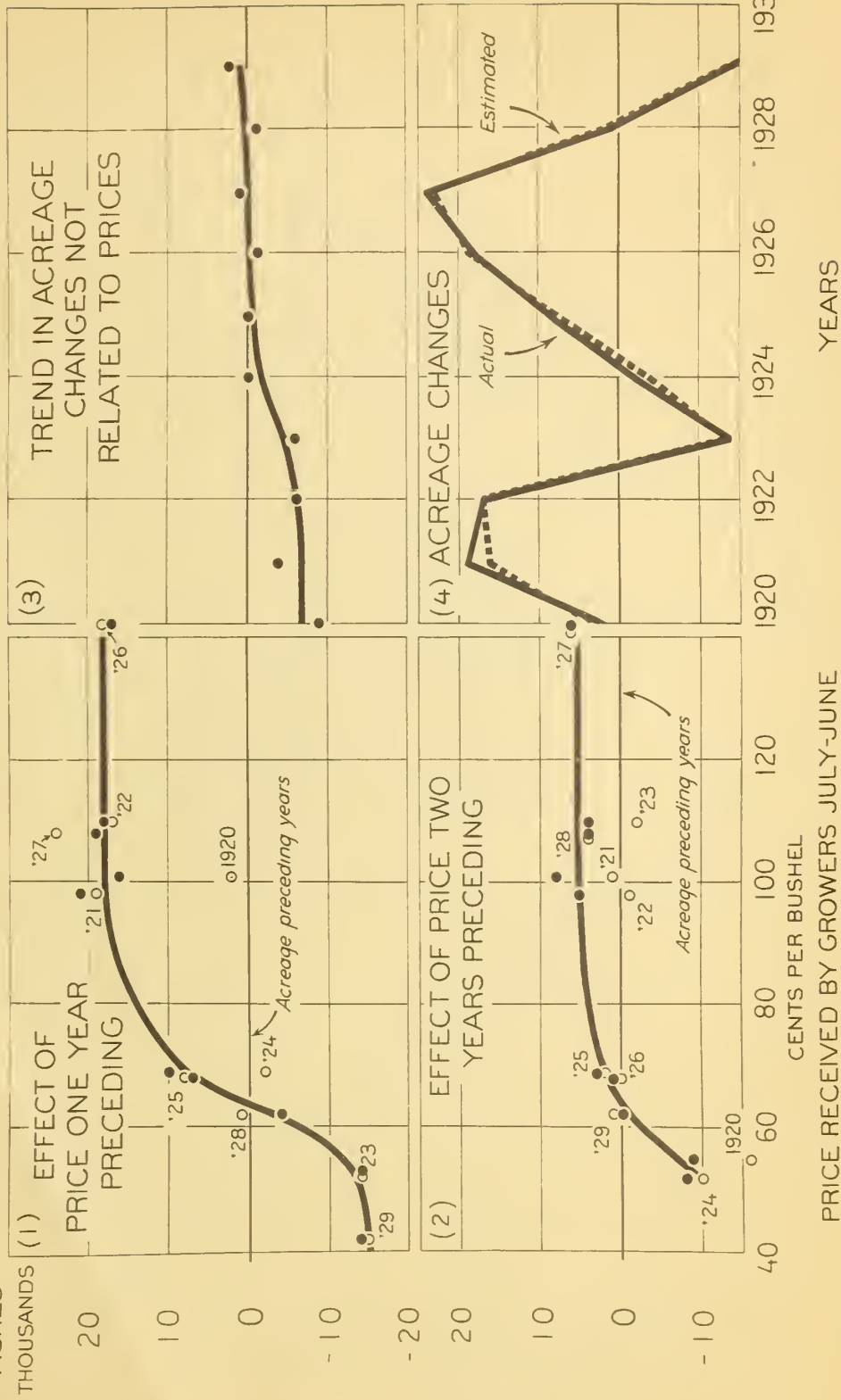


Figure 5



RELATION OF SUPPLY AND OTHER FACTORS TO THE YEARLY AVERAGE FARM PRICE OF POTATOES, 1908-1928

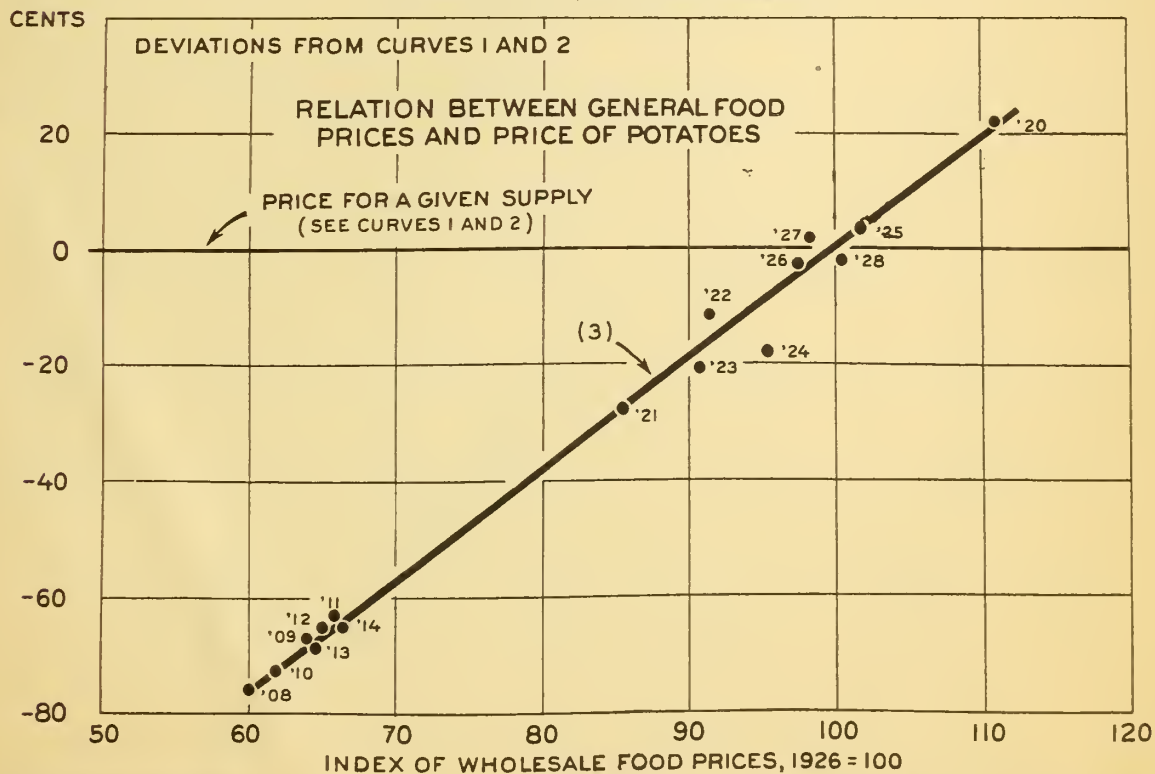
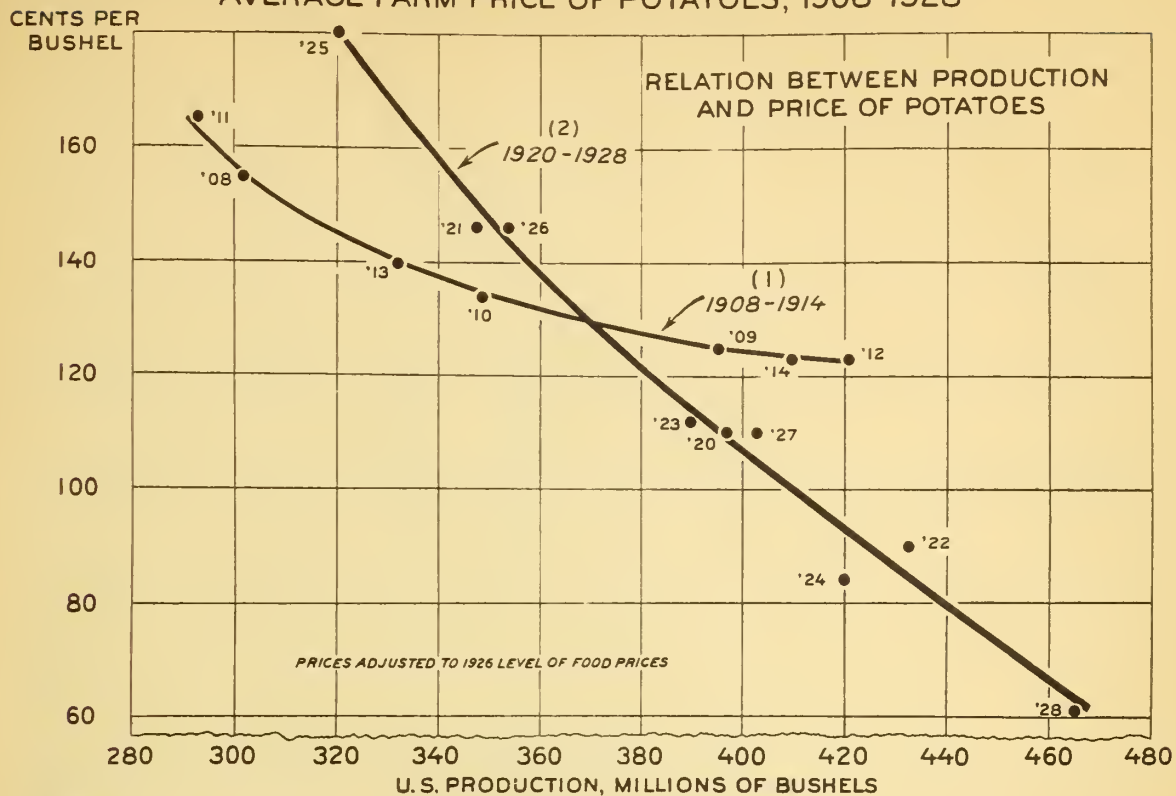


Figure 6.

Trends in Industrial Activity in the United States Following the Peaks of 1920, 1923, 1926, and 1929

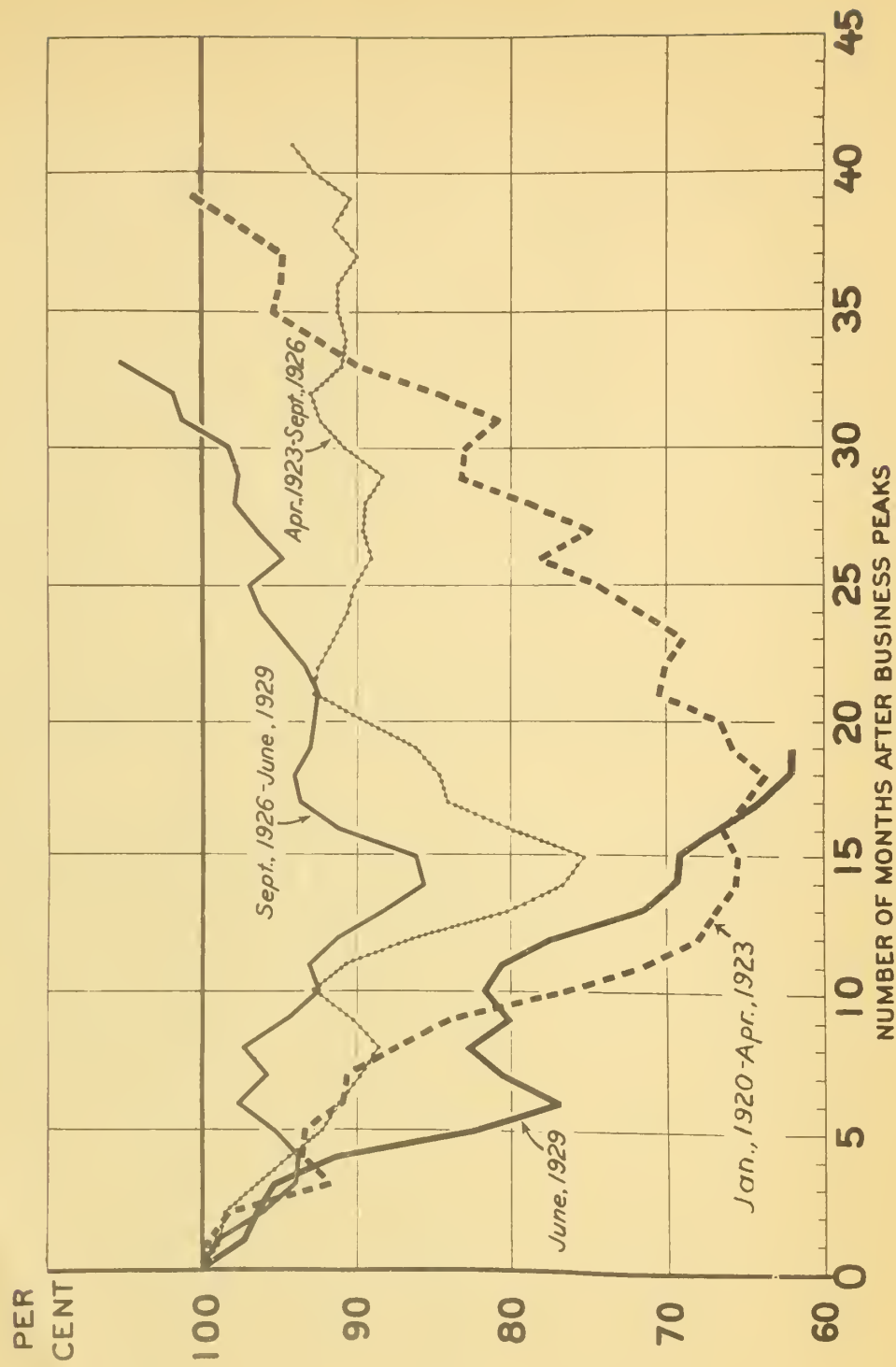


FIGURE 7 (NEG.No. 21647)

Table 1.- Acreage, yield per acre, production, and average price per bushel received by producers for potatoes in Idaho, 1919-1930

Year	Acreage	Average yield per acre	Production 1/	Average price per bushel
	1,000 acres	Bushels	Million bushels	Cents
1919	43	155	6.7	160
1920	45	180	8.1	108
1921	64	185	11.8	95
1922	81	185	15.0	50
1923	67	180	12.1	66
1924	65	170	11.0	70
1925	73	196	14.3	147
1926	91	178	16.2	101
1927	115	212	24.4	62
1928	116	170	19.7	42
1929	102	168	17.1	124
1930	117	214	25.0	65(est)

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1/ Trend equals 10,000,000 bushels in 1921 and 22,500,000 bushels in 1930.

Table 2.- Average price per 100 pounds received by producers for potatoes in the United States, f.o.b. price at Idaho Falls, and production in Idaho as deviation from trend, 1922-1930

from trend, 1922-1930				
Year	Price per 100 pounds			Idaho
	United States	Idaho Falls	Difference	production
	farm price 1/	f.o.b. 2/		(deviation
				from trend)
				Million
	<u>Cents</u>	<u>Cents</u>	<u>Cents</u>	<u>bushels</u>
1922	125	---	---	---
1923	158	138	- 20	- 1.0
1924	130	122	- 8	- 2.0
1925	306	293	- 13	- 1.5
1926	237	198	- 39	- 1.0
1927	181	110	- 71	+ 6.0
1928	104	76	- 28	0.
1929	228	218	- 10	- 4.0
1930	167	100	- 67	+ 2.5

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1/ Weighted average, July-June.

2/ Monthly averages September-March, weighted by Idaho shipments.

Table 3.- Price premium of Idaho Russet Burbank potatoes over other potatoes at Chicago in November and shipments from Idaho, 1922-1930

Year	Nov. price per 100 pounds at Chicago			Shipments	
	Russet	Other	Premium	from Idaho	
	Cents	Cents	Cents	1,000 cars	
1922	157	88	69	16.2	
1923	191	99	92	15.6	
1924	204	98	106	11.9	
1925	399	345	54	18.3	
1926	293	241	52	17.3	
1927	175	153	22	28.3	
1928	165	89	76	18.9	
1929	286	231	55	19.0	
1930	188	162	26	<u>1/</u>	

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1/ Estimated at 30,000 cars in Figure 3.

Table 4.- Relation of price of potatoes received by producers to changes in the United States potato acreage, 1919-1930

Year	Acreage	acreage	Weighted: average	Index of farm prices	Farm prices adjusted, 1927-28 = 100	Effect of price: One year preceding	Two years preceding	Trend	Residuals
		change	price per bushel 1/	July- June 2/					
	1,000	1,000	Cents		Cents	1,000	1,000	1,000	1,000
	acres	acres				acres	acres	acres	acres
1919				220	140.3				
1920	3,657		223.8						
1921	3,941		131.5	152	119.4				
1922	4,307	+ 284	121.3	119	140.6	+ 345	+ 50	- 100	- 11
1923	3,816	+ 366	73.9	130	78.4	+ 365	+ 40	- 100	+ 61
1924	3,816	- 491	94.2	132	98.5	- 420	+ 50	- 100	- 21
1925	3,510	- 506	76.5	142	74.4	- 70	- 325	- 100	- 11
1926	3,074	- 236	183.5	145	177.1	- 450	0	0	+ 214
1927	3,120	+ 46	140.8	129	150.6	+ 375	- 350	0	+ 21
1928	3,476	+ 356	108.4	138	108.4	+ 365	+ 50	0	- 59
1929	3,837	+ 361	61.3	137	61.7	+ 280	+ 50	0	+ 31
1930	3,338	- 499	136.2	133	141.3	- 490	+ 25	0	3/- 34
	3,394	+ 56	97.3	98	137.0				

1/ United States Department of Agriculture Yearbook 1930. P. 775

2/ Index numbers of farm prices received by producers (August 1909-July 1914 = 100)

3/ Residual of +2,000 acres in Figure 4 based on preliminary estimate of total acreage of 3,370,000 acres.

Table 5.- Relation of price of potatoes received by producers to changes in the potato acreage in Idaho, 1919-1930

Year	Acreage	Acreage change	Weighted: average of farm price per bushel	Index of farm prices July - June 1/	Prices adjusted: 1927-28 = 100	Effect of price: One year preceding; Two years preceding	Trend	Residuals
	1,000 acres	1,000 acres	Cents		Cents	1,000 acres	1,000 acres	1,000 acres
1919	43		160	220	101			
1920	45	+ 2	108	152	98	+ 18	- 7	- 2
1921	64	+ 19	95	119	110	+ 18	- 7	+ 3
1922	81	+ 17	50	130	52	+ 18	- 6	0
1923	67	- 14	66	132	69	- 13	- 5	- 1
1924	65	- 2	70	142	68	+ 8	- 2	+ 2
1925	73	+ 8	147	143	142	+ 6	- 1	+ 1
1926	91	+ 18	101	129	108	+ 18	0	- 1
1927	115	+ 24	62	138	62	+ 13	0	+ 1
1928	116	+ 1	42	137	42	- 3	0	- 1
1929	102	- 14	124	133	128	- 15	+ 1	+ 1
1930	117	+ 15	2/ 65	2/ 98	2/ 91			

1/ United States Department of Agriculture, August 1909-July 1914 = 100.

2/ Estimated.

Table 6. - Factors related to the United States average farm price of potatoes, readings from curves, and residuals, 1908-1914 and 1920-1930

	Potatoes			Readings from curves				
		Weighted	Index of					
		average	wholesale					
	United	farm	prices of				Estimated:	
Year	States	price per	foods	I and II:	III		prices	Residuals
	production:	bushel, July - June	July - June				(sum)	
		July - June:	1926=100:					
		1/						
	Million							
	<u>bushels</u>	<u>Cents</u>		<u>Cents</u>	<u>Cents</u>	<u>Cents</u>	<u>Cents</u>	<u>Cents</u>
1908...	302	79.0	60.2	155	- 76	79	0	
1909...	395	57.9	64.7	125	- 67	58	0	
1910...	349	61.3	61.8	134	- 73	61	0	
1911...	293	99.6	65.7	163	- 65	98	+ 2	
1912...	421	55.6	65.0	121	- 67	54	+ 2	
1913...	352	70.6	63.9	140	- 69	71	0	
1914...	410	58.0	66.5	123	- 64	59	- 1	
1920...2/	397	131.5	111.1	110	+ 22	132	0	
1921...2/	348	121.3	86.8	149	- 25	124	- 3	
1922...2/	435	73.9	91.6	85	- 16	69	+ 5	
1923...2/	390	94.2	90.7	115	- 18	97	- 3	
1924...	420	76.5	95.8	94	- 8	86	-10	
1925...	521	183.5	101.5	181	+ 3	184	0	
1926...	354	140.8	97.4	144	- 5	139	+ 2	
1927...	407	108.4	98.6	106	- 2	104	+ 4	
1928...	465	61.3	100.2	63	0	63	- 2	
1929...	359	136.2	97.6	140	- 5	135	+ 1	
1930...	361	97.3	83.3					

1/ United States Department of Agriculture Yearbook, 1930, p. 775.

2/ Adjusted estimate of total production.

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